

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/625,993

REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has canceled claims 11 and 12 and added new claims 28-32. Thus, claims 1-5, 9, 10, 13-18, 28-32 are now pending in the application. In response to the Office Action (Paper No. 30), Applicant respectfully submits that the pending claims define patentable subject matter.

As a preliminary matter, the undersigned thanks the Examiner for the courtesy of the telephone interview on February 26, 2004. Along with this Amendment, Applicant is submitting a Statement of Substance of Interview.

Dependent claim 10 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form. By this Amendment, Applicant has rewritten dependent claim 10 in independent form to place claim 10 in condition for allowance.

Claims 1-5 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the Examiner alleges that it is unclear whether the claimed stator is made of a single piece or two pieces.¹ As discussed during the telephone interview, the Examiner believes the phrase "an annular shaped, single piece stator core formed as a lamination of a plurality of sheet-shaped magnetic members" renders claim 1 indefinite. By this Amendment, Applicant has amended claim 1 to improve clarity by reciting "an annular shaped stator core formed as a lamination of a plurality of sheet-shaped magnetic members, ... said lamination having a first

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/625,993

end surface and a second end surface fixed directly together to form said annular shape.”²

Applicant respectfully submits that amended claim 1 satisfies the definiteness requirement of 35 U.S.C. § 112, second paragraph, and clearly describes the structure disclosed in the specification and drawings. Accordingly, the Examiner is requested to remove the § 112, second paragraph, rejection of claim 1-5.

Claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. (U.S. Patent No. 5,592,731) in view of Beard (U.S. Patent No. 2,502,121) and Tang (U.S. Patent No. 5,811,905). Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable Huang in view of Beard, Tang and Maruyama et al. (U.S. Patent No. 6,194,800). Claims 9, 11 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang in view of Beard, Tang and Muller (U.S. Patent No. 5,834,873). Claims 3-5, 12-14 and 16-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang in view of Beard, Tang, Muller and Maruyama.

Applicant respectfully traverses the prior art rejections.

With regard to the § 103 rejection of independent claim 1 in view of Huang, Beard and Tang, Applicant respectfully submits that the combined references do not teach or suggest “an annular shaped stator core formed as a lamination of a plurality of sheet-shaped magnetic

¹ Although the statement of the rejection lists claims 1-5 and 9-18 as being rejected under 35 U.S.C. § 112, second paragraph, only claims 1-5 recite a “single piece stator core”. Therefore, claims 9-18 should not be included in the 112, second paragraph, rejection.

² As described on pages 6 and 7 and shown in Figures 1, 3 and 4 of the present application, the stator core is initially formed into an rectangular shape by laminating a predetermined number of sheet-shaped magnetic members punched into a predetermined shape (i.e., having a plurality of teeth defining a plurality of slots). After insulators and wire strands are inserted in the slots, end surfaces of the stator core are brought together and welded to form a single piece core having an annular shape.

members, ... said lamination having a first end surface and a second end surface fixed directly together to form said annular shape”, as claimed.

As shown in Figs. 4-10, Huang teaches the stator core is divided into a plurality of (at least) two circumferential segments (see col. 6, lines 55-58). Thus, Huang’s stator core cannot have first and second end surfaces which are directly fixed together to form the annular shape of the stator core.³ Further, Beard shares this deficiency in Huang since Beard teaches utilizing two separate stator core segments. Lastly, Tang shows a continuous one-piece stator core in the drawings and does not discuss the particular structure or formation of the stator core.

Accordingly, Applicant respectfully submits that independent claim 1, as well as dependent claims 2-5, should be allowable over combination of Beard, Huang and Tang because the combined references do not teach or suggest all of the features of the claims, and one of ordinary skill in the art would not have been motivated to combine and modify the teachings of the cited references to produce the claimed invention.

With regard to the § 103 rejection of independent claim 9 in view of Huang, Beard, Tang and Muller, the Examiner maintains that Muller discloses a stator core “wherein widths of said teeth which define said slots alternate in size in the circumferential direction.” That is, the Examiner appears to be taking the position that Muller (Fig. 2) discloses that the lengths of projections at the ends of teeth alternate in size in the circumferential direction (i.e., the claim language allegedly reads on the projections which are part of the teeth).

³ The stator core of Huang requires a thermal expansion technique to form an interference fit of the multiple segments. See col. 8, line 61 to col. 9, line 13, et. seq.

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/625,993

By this Amendment, Applicant has amended independent claim 9 to incorporate the subject matter of dependent claim 11 and 12. Applicant respectfully submits that it is quite clear that the combined references do not teach or suggest “wherein widths of said teeth which define said slots alternate in size in a circumferential direction so that an interval in the circumferential direction between a center of air gaps of adjacently formed slot opening portions is an alternating electrical angle of α degrees and $(60 - \alpha)$ degrees, and said α degrees is in a range from 16-29 degrees”, as required by claim 9. As discussed on pages 5 and 6 of the present application, by making the electrical angle alternate in this range, the 5th, 7th, 11th and 13th higher harmonic components of magnetomotive force in the stator are lowered (thereby reducing unpleasant noise to which the vehicle occupants may be exposed) with good balance, as compared to the conventional stator having an non-alternating electrical angle of 30 degrees.

On the other hand, Huang, Beard, Tang and Muller do not disclose the electrical angle formed by the slot opening portions or even recognize the problems existing in conventional stators which are addressed by the present invention.

Accordingly, Applicant respectfully submits that independent claim 9, as well as dependent claim 13 and 14, should be allowable because the combined references do not teach or suggest all of the features of the claims, and one of ordinary skill in the art would not have been motivated to combine and modify the teachings of the cited references to produce the claimed invention.

With regard to the § 103 rejection of independent claim 15 under 35 U.S.C. § 103(a) in view of Huang, Beard, Tang and Muller, the Examiner maintains that the claim language of

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/625,993

“projections extending in a circumferential direction are formed on said teeth which partition said slots, said projections each having a length, and an interval in a circumferential direction between a center of air gaps of adjacently formed slot opening portions is alternated by alternating said lengths of said projections” reads on the alternating pairs of projections shown in Figure 2 of Muller.

By this Amendment, Applicant has amended independent claim 15 to improve clarity by reciting “a first set of said teeth each including first and second projections extending in a circumferential direction, said first and second projections having different lengths so that an interval in a circumferential direction between a center of air gaps of adjacently formed slot opening portions between said teeth is alternated.”⁴ Applicant respectfully submits that none of the cited references disclose this feature of the claimed invention. In particular, each of the cited references discloses that on any given tooth, the projections at the end portions of the tooth are the same length. Thus, the cited references do not teach or suggest first and second projections having different lengths on an individual tooth, as required.

Accordingly, Applicant respectfully submits that independent claim 15, as well as dependent claims 16-18, should be allowable over the combined references because the combined references do not teach or suggest all of the features of the claims, and one of ordinary skill in the art would not have been motivated to combine and modify the teachings of the cited references to produce the claimed invention.

⁴ See, for example, Figure 5 of the present application.

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/625,993

Lastly, Applicant has added new claims 28-32 which are specifically directed to the alternating electrical angle formed by the slot opening portions of the of the stator core. As discussed above with regard to claim 9, Applicant respectfully submits that claims 28-32 should be allowable because the combined references do not teach or suggest "an interval in the circumferential direction between a center of air gaps of adjacently formed slot opening portions is an alternating electrical angle of α degrees and $(60 - \alpha)$ degrees, and said α degrees is in a range from 16-29 degrees", as required by independent claim 28.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Christopher R. Lipp
Registration No. 41,157

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: March 1, 2004